

**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Original) A method for copying data over a network operating in accordance with a protocol that supports a given logical address range, the method comprising:

establishing a logical path over the network from a primary storage system to a secondary storage system using path logical addresses within the given logical address range;

creating a virtual path over the logical path to carry the data from a source storage device in a first logical subsystem of the primary storage system to a target storage device in a second logical subsystem of the secondary storage system, the first and second logical subsystems having respective first and second subsystem logical addresses which are outside the given logical address range;

initiating a peer-to-peer remote copy (PPRC) operation to copy the data from the source storage device to the target storage device by sending a command frame over the logical path from the primary storage system to the secondary storage system, followed by a first data frame identifying the target storage device, such that both the command and data frames are arranged to comply with the protocol; and

sending one or more further data frames over the logical path following the first data frame, the further data frames complying with the protocol and containing the data to be copied in the PPRC operation.

2. (Original) A method according to claim 1, wherein creating the virtual path comprises creating a plurality of

virtual paths to carry the data between respective source and target storage devices, and wherein establishing the logical path comprises designating one of the path logical addresses to carry the plurality of the virtual paths.

3. (Original) A method according to claim 2, and comprising:

establishing a further logical path over the network to carry the data in a further PPRC operation between further source and destination storage devices in third and fourth logical subsystems of the primary and secondary storage systems, respectively, both the third and fourth logical subsystems having respective third and fourth subsystem logical addresses within the given logical address range; and conveying the data between the further source and destination storage devices over the further logical path in accordance with the protocol.

4. (Original) A method according to claim 3, wherein the source and destination storage devices in the first and second logical subsystems comprise fixed-block storage devices, while the further source and destination storage devices in the third and fourth logical subsystems comprise devices of a type that stores records of variable size.

5. (Original) A method according to claim 2, wherein in accordance with the protocol, the command frame comprises a device header containing an address of the target storage device, and wherein the method comprises, when the frames arrive at the secondary storage system on the designated one of the path logical addresses, ignoring the device header of the command frame so as to read the second subsystem logical address and the address of the target storage device from the first data frame.

6. (Original) A method according to claim 1, wherein initiating the PPRC operation comprises creating a chain of one or more channel command words (CCWs), and reserving the logical path exclusively for the virtual path for the duration of the chain, whereby all of the frames associated with the chain are directed to the target storage device.

7. (Original) A method according to claim 6, and comprising, upon completion of the chain, sending an ending status frame in accordance with the protocol from the secondary storage system to the primary storage system to indicate successful completion of the CCWs, and releasing the reserved logical path responsive to the ending status frame.

8. (Original) A method according to claim 1, wherein initiating the PPRC operation comprises inserting a command parameter list in a data block of the first data frame, wherein the list identifies the second logical subsystem and the target storage device.

9. (Original) A method according to claim 8, wherein the command parameter list belongs to a Write Fixed Block Data (WFBD) command in accordance with a Small Computer System Interface (SCSI) standard.

10. (Original) A method according to claim 8, wherein the command parameter list belongs to a count key data (CKD) Prefix.

11. (Original) A method for copying data over a network operating in accordance with a protocol that supports storage devices of a first type that store records of variable size, the method comprising:

establishing a logical path over the network to carry the data from a source storage device in a primary storage system to a target storage device in a secondary storage system, both

the source and target storage devices being of a second type that store records only of fixed-block size;

initiating a peer-to-peer remote copy (PPRC) operation to copy the data from the source storage device to the target storage device by sending a command frame over the logical path from the primary storage system to the secondary storage system, followed by a first data frame identifying the target storage device, such that both the command and data frames are in a form compliant with the protocol for the first type of storage devices that store records of variable size; and

sending one or more further data frames over the logical path following the first data frame, the further data frames complying with the protocol and containing the data to be copied in the PPRC operation.

12. (Original) A method according to claim 11, wherein the first type of storage devices comprises a count key data (CKD) type, while the second type of storage devices comprises a Small Computer System Interface (SCSI) type.

13. (Original) A method according to claim 11, and comprising:

establishing a further logical path over the network to carry the data in a further PPRC operation between further source and destination storage devices of the first type in the primary and secondary storage systems, respectively; and

conveying the data between the further source and destination storage devices over the further logical path in accordance with the protocol.

14. (Original) A method according to claim 11, wherein in accordance with the protocol, the command frame comprises a device header containing an address of the target storage device, and wherein the method comprises, when the frames

arrive at the secondary storage system, ignoring the device header of the command frame so as to read the address of the target storage device from the first data frame.

15. (Original) A method according to claim 11, wherein initiating the PPRC operation comprises inserting a command parameter list in a data block of the first data frame, wherein the list identifies the second logical subsystem and the target storage device.

16. (Original) A data storage system, comprising:

one or more logical subsystems, including at least a first logical subsystem having a first subsystem logical address, each of the logical subsystems comprising one or more storage devices arranged to store data; and

a control unit, coupled to the logical subsystems and to a network operating in accordance with a protocol that supports a given logical address range, the control unit being arranged to establish a logical path over the network to a secondary storage system using path logical addresses within the given logical address range, and to create a virtual path over the logical path to carry the data from a source storage device among the one or more storage devices in the first logical subsystem to a target storage device in a second logical subsystem of the secondary storage system having a second subsystem logical address, wherein the first and second subsystem logical addresses are outside the given logical address range,

wherein the control unit is further arranged to initiate a peer-to-peer remote copy (PPRC) operation to copy the data from the source storage device to the target storage device by sending a command frame over the logical path to the secondary storage system, followed by a first data frame identifying the

target storage device, such that both the command and data frames are arranged to comply with the protocol, and to send one or more further data frames over the logical path following the first data frame, the further data frames complying with the protocol and containing the data to be copied in the PPRC operation.

17. (Original) A system according to claim 16, wherein the control unit is arranged to create a plurality of virtual paths to carry the data between respective source and target storage devices, wherein one of the path logical addresses is designated to carry the plurality of the virtual paths.

18. (Original) A system according to claim 17, wherein the control unit is arranged to establish a further logical path over the network to carry the data in a further PPRC operation from a further source storage devices in a third logical subsystem, among the logical subsystems of the data storage system, to a further target device in a fourth logical subsystem of the secondary storage system, both the third and fourth logical subsystems having respective third and fourth subsystem logical addresses within the given logical address range, and to convey the data between the further source and destination storage devices over the further logical path in accordance with the protocol.

19. (Original) A system according to claim 18, wherein the source and destination storage devices in the first and second logical subsystems comprise fixed-block storage devices, while the further source and destination storage devices in the third and fourth logical subsystems comprise devices of a type that stores records of variable size.

20. (Original) A system according to claim 17, wherein in accordance with the protocol, the command frame comprises a

device header containing an address of the target storage device, and wherein when the frames arrive at the secondary storage system on the designated one of the path logical addresses, the device header of the command frame is ignored by the secondary storage system, which reads the second subsystem logical address and the address of the target storage device from the first data frame.

21. (Original) A system according to claim 16, wherein the control unit is arranged to create a chain of one or more channel command words (CCWs), and to reserve the logical path exclusively for the virtual path for the duration of the chain, whereby all of the frames associated with the chain are directed to the target storage device.

22. (Original) A system according to claim 21, wherein upon completion of the chain, an ending status frame is sent in accordance with the protocol from the secondary storage system to the control unit to indicate successful completion of the CCWs, and the reserved logical path is released responsive to the ending status frame.

23. (Original) A system according to claim 16, wherein to initiate the PPRC operation, the control unit is arranged to insert a command parameter list in a data block of the first data frame, wherein the list identifies the second logical subsystem and the target storage device.

24. (Original) A system according to claim 23, wherein the command parameter list belongs to a Write Fixed Block Data (WFBD) command in accordance with a Small Computer System Interface (SCSI) standard.

25. (Original) A system according to claim 23, wherein the command parameter list belongs to a count key data (CKD) Prefix.

26. (Original) A data storage system, comprising:

a plurality of storage devices arranged to store data, the devices comprising one or more devices of a first type that store records of variable size and one or more devices of a second type that store records only of a fixed-block size; and

a control unit, coupled to the storage devices and to a network operating in accordance with a protocol that supports the storage devices of the first type, the control unit being arranged to establish a logical path over the network to carry the data from a source storage devices among the storage devices of the second type to a target storage device of the second type in a secondary storage system, and to initiate a peer-to-peer remote copy (PPRC) operation to copy the data from the source storage device to the target storage device by sending a command frame over the logical path to the secondary storage system, followed by a first data frame identifying the target storage device, such that both the command and data frames are in a form compliant with the protocol, and to send one or more further data frames over the logical path following the first data frame, the further data frames complying with the protocol and containing the data to be copied in the PPRC operation.

27. (Original) A system according to claim 26, wherein the first type of storage devices comprises a count key data (CKD) type, while the second type of storage devices comprises a Small Computer System Interface (SCSI) type.

28. (Original) A system according to claim 26, wherein the control unit is arranged to establish a further logical path over the network to carry the data in a further PPRC operation between a further source storage device among the storage



devices of the first type and a further destination storage device of the first type in the secondary storage systems, respectively, and to convey the data between the further source and destination storage devices over the further logical path in accordance with the protocol.

29. (Original) A system according to claim 26, wherein in accordance with the protocol, the command frame comprises a device header containing an address of the target storage device, and wherein when the frames arrive at the secondary storage system on the designated one of the path logical addresses, the device header of the command frame is ignored by the secondary storage system, which reads the address of the target storage device from the first data frame.

30. (Original) A system according to claim 26, wherein to initiate the PPRC operation, the control unit is arranged to insert a command parameter list in a data block of the first data frame, wherein the list identifies the second logical subsystem and the target storage device.

31. (Original) A computer software product for use in a data storage system that is coupled to a network operating in accordance with a protocol that supports a given logical address range, the data storage system including one or more logical subsystems, which include at least a first logical subsystem having a first subsystem logical address, each of the logical subsystems including one or more storage devices arranged to store data, the product comprising a computer-readable medium in which program instructions are stored, which instructions, when read by a computerized control unit of the data storage system, cause the control unit to establish a logical path over the network to a secondary storage system using path logical addresses within the given

logical address range, and to create a virtual path over the logical path to carry the data from a source storage device among the one or more storage devices in the first logical subsystem to a target storage device in a second logical subsystem of the secondary storage system having a second subsystem logical addresses, wherein the first and second subsystem logical addresses are outside the given logical address range, and

wherein the instructions further cause the control unit to initiate a peer-to-peer remote copy (PPRC) operation to copy the data from the source storage device to the target storage device by sending a command frame over the logical path to the secondary storage system, followed by a first data frame identifying the target storage device, such that both the command and data frames are arranged to comply with the protocol, and to send one or more further data frames over the logical path following the first data frame, the further data frames complying with the protocol and containing the data to be copied in the PPRC operation.

32. (Original) A product according to claim 31, wherein the instructions cause the control unit to create a plurality of virtual paths to carry the data between respective source and target storage devices, wherein one of the path logical addresses is designated to carry the plurality of the virtual paths.

33. (Original) A product according to claim 32, wherein the instructions cause the control unit to establish a further logical path over the network to carry the data in a further PPRC operation from a further source storage devices in a third logical subsystem, among the logical subsystems of the data storage system, to a further target device in a fourth

logical subsystem of the secondary storage system, both the third and fourth logical subsystems having respective third and fourth subsystem logical addresses within the given logical address range, and to convey the data between the further source and destination storage devices over the further logical path in accordance with the protocol.

34. (Original) A product according to claim 33, wherein the source and destination storage devices in the first and second logical subsystems comprise fixed-block storage devices, while the further source and destination storage devices in the third and fourth logical subsystems comprise devices of a type that stores records of variable size.

35. (Original) A product according to claim 32, wherein in accordance with the protocol, the command frame comprises a device header containing an address of the target storage device, and wherein when the frames arrive at the secondary storage system on the designated one of the path logical addresses, the device header of the command frame is ignored by the secondary storage system, which reads the second subsystem logical address and the address of the target storage device from the first data frame.

36. (Original) A product according to claim 31, wherein the instructions cause the control unit to create a chain of one or more channel command words (CCWs), and to reserve the logical path exclusively for the virtual path for the duration of the chain, whereby all of the frames associated with the chain are directed to the target storage device.

37. (Original) A product according to claim 36, wherein upon completion of the chain, an ending status frame is sent in accordance with the protocol from the secondary storage system to the control unit to indicate successful completion of the

CCWs, and the reserved logical path is released responsive to the ending status frame.

38. (Original) A product according to claim 31, wherein to initiate the PPRC operation, the instructions cause the control unit to insert a command parameter list in a data block of the first data frame, wherein the list identifies the second logical subsystem and the target storage device.

39. (Original) A product according to claim 38, wherein the command parameter list belongs to a Write Fixed Block Data (WFBD) command in accordance with a Small Computer System Interface (SCSI) standard.

40. (Currently amended) A product according to ~~claim 23~~claim 38, wherein the command parameter list belongs to a count key data (CKD) Prefix.

41. (Original) A computer software product for use in a data storage system that includes a plurality of storage devices arranged to store data, including one or more devices of a first type that store records of variable size and one or more devices of a second type that store records only of a fixed-block size, wherein the data storage system is coupled to a network operating in accordance with a protocol that supports the storage devices of the first type, the product comprising a computer-readable medium in which program instructions are stored, which instructions, when read by a computerized control unit of the data storage system, cause the control unit to establish a logical path over the network to carry the data from a source storage devices among the storage devices of the second type to a target storage device of the second type in a secondary storage system, and to initiate a peer-to-peer remote copy (PPRC) operation to copy the data from the source storage device to the target storage device by sending

a command frame over the logical path to the secondary storage system, followed by a first data frame identifying the target storage device, such that both the command and data frames are in a form compliant with the protocol, and to send one or more further data frames over the logical path following the first data frame, the further data frames complying with the protocol and containing the data to be copied in the PPRC operation.

42. (Original) A product according to claim 41, wherein the first type of storage devices comprises a count key data (CKD) type, while the second type of storage devices comprises a Small Computer System Interface (SCSI) type.

43. (Original) A product according to claim 41, wherein the instructions cause the control unit to establish a further logical path over the network to carry the data in a further PPRC operation between a further source storage device among the storage devices of the first type and a further destination storage device of the first type in the secondary storage systems, respectively, and to convey the data between the further source and destination storage devices over the further logical path in accordance with the protocol.

44. (Original) A product according to claim 41, wherein in accordance with the protocol, the command frame comprises a device header containing an address of the target storage device, and wherein when the frames arrive at the secondary storage system on the designated one of the path logical addresses, the device header of the command frame is ignored by the secondary storage system, which reads the address of the target storage device from the first data frame.

45. (Original) A product according to claim 41, wherein to initiate the PPRC operation, the instructions cause the

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control unit to insert a command parameter list in a data block of the first data frame, wherein the list identifies the second logical subsystem and the target storage device.